M/045/003

DOGM
MINERALS PROGRAM
FILE COPY

Marblehead Lime Company
A General Dynamics Company

390 East Joe Orr Road
Chicago Heights, Illinois 60411
312/757-6201

February 28, 1989

RECEIVED
MAR 06 1989
DIVISION OF
OIL, GAS & MINING

Mr. Wayne Hedberg
State of Utah
Department of Natural Resources
Division of Oil, Gas and Mining
355 West North Temple
3 Triad Center, Suite 350
Salt Lake City, Utah 84180-1203

RE: VEGETATION TEST PLOTS
UTAH MARBLEHEAD LIME MINE, M/045/003
TOOELE COUNTY, UTAH

Dear Mr. Hedberg:

Per our meeting of February 21, 1989, I have attached copies of the proposals received from Mel Coonrod for implementing new test plots and also a copy of Mel's results on the first years monitoring of the test plots originally established in 1985, which both you and Holland Shepard requested.

After meeting with Mel Coonrod, a tentative date of October 2nd and 3rd has been established to implement these test plots. I will reconfirm these dates with you as October approaches so you and Holland can schedule your time. All work involving plot preparation will be done as close to seeding as possible.

If additional information is required, please feel free to contact me at anytime.

Sincerely,

MARBLEHEAD LIME COMPANY

Philip N. Raines
Asst. to Vice President of Operations

PNR/bb
Attachments

cc: E. J. Penman

E I S

ENVIRONMENTAL INDUSTRIAL SUPPLY

P.O. Box 358 - Elmo, Utah 84521 - Telephone (801) 653-2606

Mel Coonrod - Reclamation Scientist
Hydro Seeding & Planting - Field Consultants
Complete Reclamation Supplies

October 1, 1986

Mr. Phillip N. Raines
Marblehead Lime Company
390 East Joe Orr Road
Chicago Heights, Illinois 60411

RE: Vegetation Test Plots
Marblehead Lime, Delle, Utah

Dear Phillip:

Please find attached, the results from our first year monitoring of the test plots at Delle, Utah. I have also outlined a brief scenario of the methodology utilized in establishing the plots.

It's important to note that the results by themselves are not necessarily indicative as to what the end results may be. A number of individual seedlings that were counted in each plot appeared to have died; also, there is really no way to determine vigor on a scientific basis, but there was a wide range of vigor of individual plants within each of the plots.

I am confident that next year's results will be much more conclusive.

I appreciate the opportunity to have worked with you on this and look forward to working with you in the future.

Sincerely,

Melvin A. Coonrod

MC/njc

cc: Jack Minchey

Vegetative Test Plots

Marblehead Lime Company

Methodology:

In October of 1985, B & R Reclamation, utilizing a crew of 4 men, and 1 Bowie 2500 hydroseeder, implemented the following:

An area of 20 X 50 meters was fenced utilizing 6' metal posts on 10' center with 2 strands of barbed wire. The intent of the fence was to preclude domestic grazing and incidental tresspass by heavy equipment which work in the adjacent areas.

Within this enclosure, 5 individual test plots were delineated on the ground with wooden stakes at each corner, and a descriptive stake in the center of each plot identifying the individual treatment. Each plot was 8 x 13 meters (app. 100 sq. meters). In addition, at the southern end of the enclosure, 8 strips 1 meter x 5 meters were laid out to plant each of the eight species utilized in the seed mix. (See figure 1).

The area to be utilized for the test had approximately 1' of top dressing of mine by-products (tailings). During the preparation of the plots, approximately 4" of snow covered the site and required the use of a grader to clear snow prior to seeding, fertilization and mulching.

Two different fertilizer treatments were recommended for comparison;

the BLM's recommended mix at a rate of 10-20-10 pounds per acre, and a UDOGM recommended mix at 40-0-30 pounds per acre. NH_4SO_4 was used to help mitigate the high sodium content of the soil. It was necessary to substitute 16-16-8 fertilizer in place of the BLM's recommendation of 10-20-10 fertilizer based on availability. Wood fiber mulch was utilized at 2,000# per acre and was applied in a uniform layer utilizing the hydroseeder. Seed and fertilizer were weighed so that it was applied at a rate of 14# of seed per acre and 100# of available fertilizer per acre. The application was by Cyclone Hand Seeders.

The northern most plot 1 was utilized as a control, seed was raked in to lightly cover, but received no fertilizer or mulch. Plot 2 received raked seed and 40-0-30 fertilizer. Plot 3 raked seed, 40-0-30 fertilizer and 2000# wood fiber mulch. Plot 4 received raked seed, 16-16-8 fertilizer and 2000# wood fiber mulch. Plot 5 received raked seed and 16-16-8 fertilizer.

The following seed mix was utilized:

Species	lbs. Pure Live Seed/Acre
Bluebunch Wheatgrass	2
Thickspike Wheatgrass	2
Galleta Grass	2
Indian Ricegrass	2
Gooseberryleaf Globemallow	1
Yellow Sweetclover	1
Winterfat	2
Four-wing Saltbush	2
	14 Total

In addition to the 5 plots, each of the above listed species were seeded in a designated area.

On August 25th, 1986, a followup study was conducted on the test plots. A 1 sq. meter frame was used and randomly placed at three locations within each plot. The following information was obtained:

1. Species composition
2. Number of individual seedlings
3. Estimates of total vegetative cover (Excluding weed species)

In addition, some judgements were made as to vigor, and any factors which may be causitive to ultimate survivability. The results of that investigation are included in Figure 1.

Galleta Grass
.1% (GG)

Indian Rice Grass
1% (IR)

Yellow Sweet Clover
4% (SC)

Gooseberryleaf Globemallow
0% (GM)

Winterfat
1% (WF)

Bluebunch Wheatgrass
60% (BW)

Four-wing Saltbush
1% (4-W)

Thickspike Wheatgrass
60% (TW)

Thistle (T)
Ragweed (RW)
Unknown (UK)

P-1	
3	WF
4	RG
75	BW/TW
1	RW

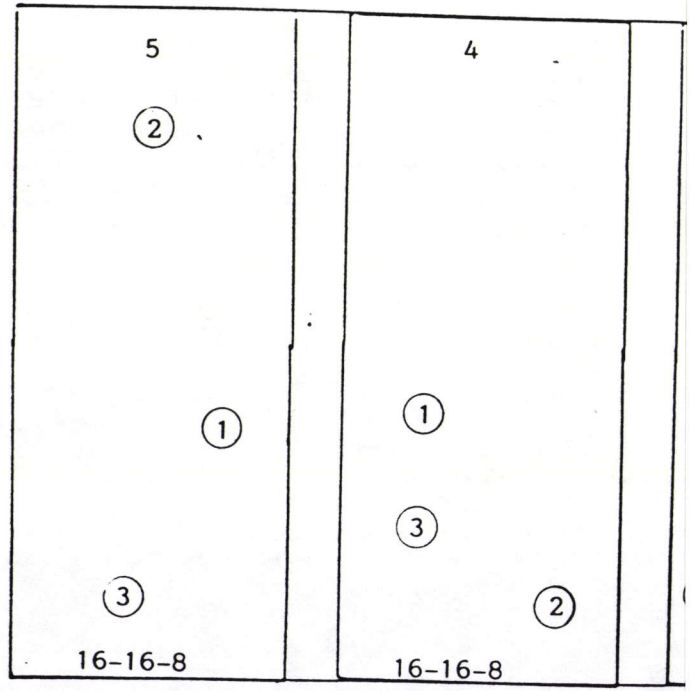
P-2	
5	BW/TW
2	T
2	RW

P-3	
2	SC
2	WF
1	IR
23	BW/TW
4	RW

P-1	
45	SC
57	IR
87	BW/TW

P-2	
120	SC
1	WF
99	IR
242	BW/TW
6	GG
2	T
1	RW

P-3	
76	SC
24	IR
83	BW/TW
4	T



Plot 4 16-16-8 Fertilizer, 2000# Wood fiber mulch

847 Total plans (including weeds) 3% sample

Wheatgrasses	48%
Sweet Clover	28%
Indian Rice Grass	21%
Galleta Grass	.7%
Thistle	.7%
Winter Fat	<.1%
Rag Weed	<.1%

Desired species comprise 97.7% vegetative cover

Vigor - good 18% ground cover by vegetation

Plot 5 16-16-8 Fertilizer Only

124 Total Plans (including weeds) 3% sample

Wheatgrasses	83%
Ragweed	8%
Winter Fat	4%
Indian Rice Grass	1%
Thistle	1%
Sweet Clover	1%

Desired species comprises 89% vegetative cover

Vigor - poor <5% ground cover by vegetation.

Conclusion:

This preliminary appraisal of the plots would indicate that:

(1) Wood fiber mulch appears to greatly enhance establishment.

(2) The 16-16-8 fertilizer application appears to be superior over the 40-0-30 application.

(3) Based on the Strip Planting with no treatment, it appears that an increase in the seedling rate (#/acre) would improve overall success.

The following is a breakdown of % of vegetative cover on each plot by species:

Plot 1 Seed Only

196 Total plants (including weeds) 3% sample

Wheatgrasses	41%
Ragweed	49%
Sweetclover	4%
4-Wing	2%
Thistle	2%

Desired species comprise 47% vegetative cover

Vigor - poor <5% ground cover by vegetation.

Plot 2 40-0-30 Fertilizer only

116 Total plants (including weeds) 3% sample

Wheatgrasses	82%
Sweet Clover	6%
Thistle	6%
Ragweed	2%
Winter Fat	2%

Desired species comprise 90% vegetative cover

Vigor - poor (exception; Clover - vigor good) <5% ground cover by vegetation.

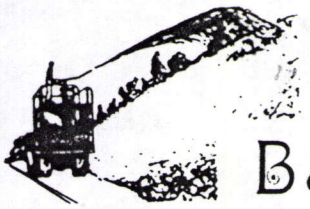
Plot 3 40-0-30 Fertilizer, 2000# Wood fiber mulch

637 Total plants (including weeds) 3% sample

Wheatgrasses	52%
Sweet Clover	24%
Indian Rice Grass	16%
Thistle	3%
Winter Fat	.6%

Desired species comprise 92.6% vegetative cover

Vigor - good (except wheatgrass - poor) 6% ground cover by vegetation



STATEMENT

B&R Reclamation Specialists

'Hydro-Seeding ★ Hydro-Mulching'

BILL O'BRIEN

P.O. Box 358
Elmo, Utah 84521

Marblehead Lime Co.
390 East Joe Orr Road
Chicago Heights, Illinois 60411

Rec'd
10/7/84

DESCRIPTION OF WORK	AMOUNT
First year vegetation monitoring Marblehead Lime Co. - Delle, Utah Plant	
Labor and materials	$200.00

Rec'd
Tech Center
11/28/88

ENVIRONMENTAL INDUSTRIAL SUPPLY

P.O. Box 358 - Elmo, Utah 84521 - Telephone (801) 653-2606

Mel Coonrod - Reclamation Scientist
Hydro Seeding & Planting - Field Consultants
Complete Reclamation Supplies

November 23, 1988

Mr. Phillip N. Raines
Marblehead Lime Company
390 East Joe Orr Road
Chicago Heights, Illinois 60411

RE: Correspondance 11/18/88
Vegetation Test Plots
Implementation and Monitoring

Dear Phil:

Please find attached a new proposal for re-implementation of the test plots at your Delle facility.

I would strongly recommend that only fall or winter implementation be considered. Based on my experience, in areas with similar weather conditions, the probability of success is greatly reduced with spring plantings. Ideally, if the seeding and mulching can be implemented concurrently with the earth work, we normally have better success. Also, if the site can be left in a "rough" condition [with small basins and contours that trap and hold moisture] the percent of vegetation cover will be greatly enhanced.

If you desire, I would be happy to meet on site with you and/or your personnel that will be doing the actual earth placement and assist in preparing the site.

Thank you for considering our firm for this project. I will look forward to hearing from you in the near future.

Sincerely,

Melvin A. Coonrod

Melvin A. Coonrod
V.P. E.I.S.
Owner, B & R Reclamation

E I S

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PROPOSAL

To monitor 5 Test Plots located Marblehead Lime Company, Delle, Utah.

Year 1 (July - August) 1989 - 90 (?)

Occular estimate of vegetative success. Determine cover, density, and limited species composition. $ 350.00

Year 3 (July - August) 1992 - 93

Transit method, 10 point frame: Establish transects determine cover by Vegetation, Rock, Litter, etc; Species composition and woody plant density. 500.00

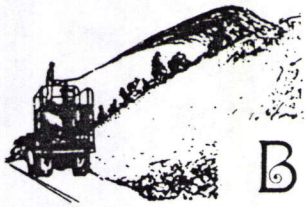
Year 5 (July - August) 1994 - 95

Same methodology as year 3 but determine productivity utilizing Harvest Method. Evaluation of each method based on results and findings. Recommendations for cost effective implementation of reclamation practices. 600.00

Total for 3 years monitoring, Not to Exceed $ 1,450.00

(Results will not be varified statistically.)

Payment to be made at completion of each monitoring year.



B&R Reclamation Specialists

'Hydro-Seeding ★ Hydro-Mulching'

BILL O'BRIEN

P.O. Box 593
Kenilworth, Utah 84529
Telephone (801) 472-5186

PROPOSAL

To implement 5 test plots on approximately 1/2 acre site adjacent to Marblehead Plant, Delle, Utah:

2 Plots @ 2000#/acre wood fiber mulch, fertilizer variance

2 Plots, no mulch, fertilizer variance

1 Plot, control, no treatment other than seed

Fence entire area approximately 1/2 acre

Materials Breakdown:

Mulch, wood fiber 1000#		$ 195.00
Seed		150.00
Tac		60.00
Fertilizer		75.00
150 6' posts		450.00
1 roll barbed wire		38.00
	Total	$ 968.00
Labor		$ 500.00
12 hrs. Bowie 2500 Hydroseeder @ $95./hr.		1,140.00
Report Preparation & Plot Plan @ $60./hr. (3 hours)		180.00
	Total Not to Exceed	$ 2,788.00